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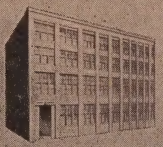

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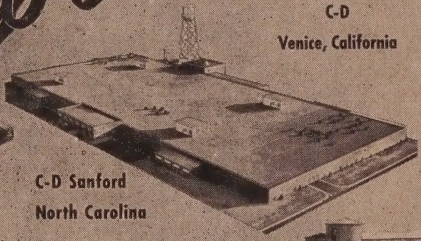

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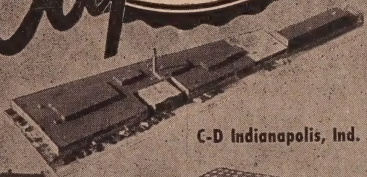

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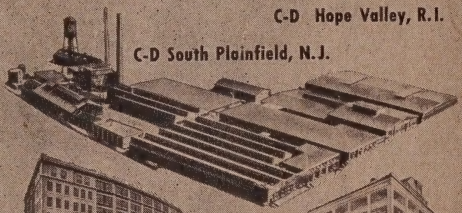

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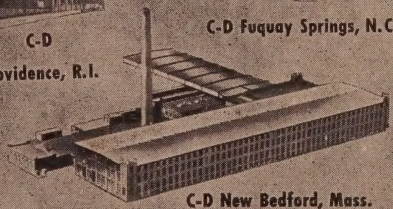

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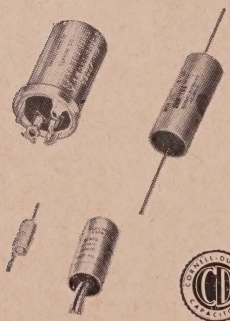

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APPLICATIONS OF SILICON JUNCTION DIODES

The field of experimental electronics has received an intriguing and useful new non-linear component in the form of the silicon junction diode. The unique nature of the conduction characteristic of this diode suits it to some applications not readily achieved with earlier diodes of the germanium, selenium, and silicon point-contact types. At the same time, many of the old conventional applications of diodes have been sharpened by use of silicon junction diodes.

and (3) a sharp increase in reverse current occurs at a critical reverse voltage, E_z. These features characterize the silicon junction diode, although the specific values of parameters cover a wide range according to type of diode.

D-C Characteristics

A survey of the typical d-c characteristics of the silicon junction diode will serve to point up the features which recommend this component for specific circuit applications.

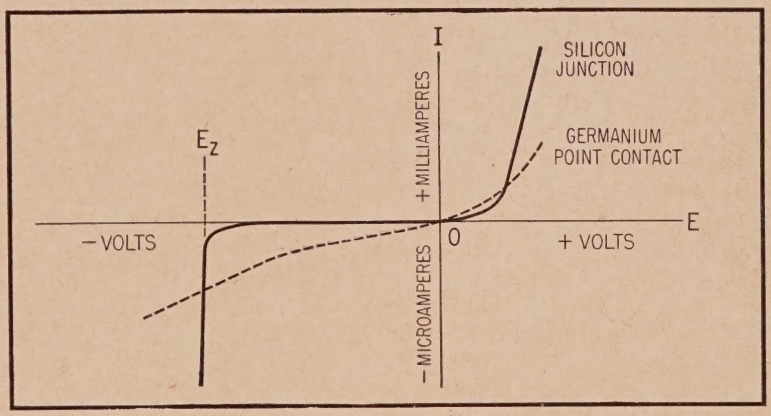

Fig. 1. Conduction Characteristic.

Figure 1 illustrates the forward and reverse conduction characteristic of the silicon junction diode compared roughly with that of the familiar germanium point-contact diode. From this plot, three features are evident: (1) in some types, the silicon junction conducts a high value of forward current; (2) reverse current is negligible over a wide range of voltage;

Forward Current and Forward Voltage Drop. Depending upon type, this varies in commercial diodes from 15 micromperes at 0.5 volt (e.g., Hoffman 1N431) to 125 milliamperes at 1 volt (e.g., Texas Instruments 650C). In the latter type, this is equivalent to a forward resistance of only 8 ohms.

Reverse Current. This reaches a value as low as 0.04 ua at −10 v (Texas

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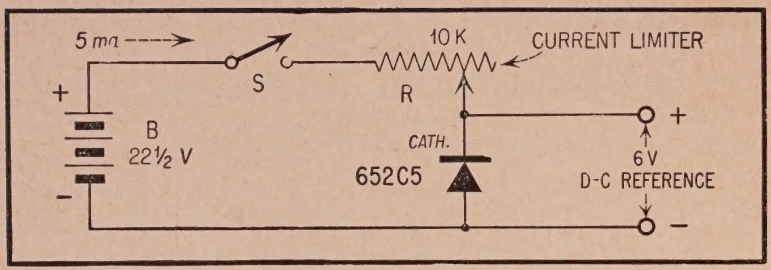

Fig. 2. D-C Voltage Reference.

Instruments 601C). This corresponds to a reverse resistance of 25 megohms. Several general-purpose silicon junction diodes pass 0.1 ua at —1 v, representing a reverse resistance of 10 megohms.

Front-to-Back Ratio. In the ±1 volt operating range, the front-to-back resistance ratio is several million to one for very-low I_b silicon junction diodes, and better than 1 million to 1 in the 0.1 ua I_b group. The current ratio in the latter category is 1 million to 1.

Zener Characteristic. At the zener voltage (—E_z in Figure 1), the reverse current increases sharply from almost cutoff to a level between 10 and 20 ma, depending upon diode type. This is somewhat similar to the abrupt breakdown in a gaseous diode tube. Zener voltage stability of 0.08% has been specified.

Although zener voltages in the 2 to 10-volt region have been of special interest to the designers of low-voltage equipment, zener points of higher than 100 v have been supplied in some diode types.

Note that this "breakdown" characteristic is not the same as the negative-resistance foldback shown by germanium point-contact diodes. The latter is unstable, non-reproducible, and generally damaging to the diode. The zener conduction region in the silicon junction diode is safe, reproducible, and stable.

Zener impedance of the diode is of the order of 10 to 25 ohms when the reverse current is in the mid-zener region.

Voltage Reference

The relative constancy of the voltage drop across the diode when the latter is conducting zener current suits the silicon junction diode for use as a low-resistance d-c voltage reference device.

Figure 2 shows a simple voltage reference circuit employing a Type 652C5 diode. Here, rheostat R is adjusted to set the reverse current to 5 milliamperes. This places the operating point comfortably into the zener region. The voltage developed across the diode is 6 volts, plus or minus 5% of this nominal value. (Exact desired voltage drop may be obtained by diode selection.) A change in battery voltage of 2 to 1 results in a change of only 3 percent in the d-c output voltage.

At the 5-ma operating level, the output resistance of this circuit is of the order of 1200 ohms. This is satisfactory for employment of the device in checking or calibrating high-input-resistance instruments.

Other reference levels up to 100v and higher may be obtained by substituting a diode with the corresponding zener point and proportioning the battery voltage and current-limiting resistance in accordance.

Power Supply Regulators

Where current drains are low (i.e., 5 to 10 ma maximum), the simple reference circuit given in Figure 2 may be used as a d-c voltage regulator comparable to the VR-tube regulator. The d-c power supply to be regulated

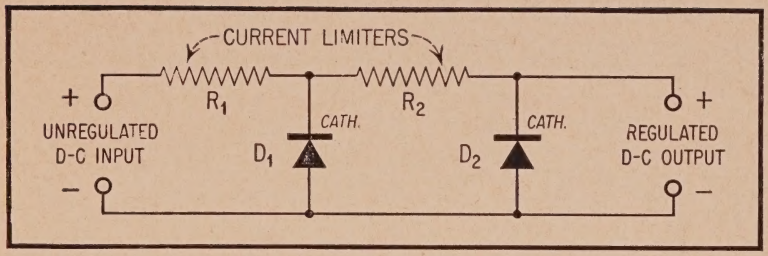

Fig. 3. 2-Stage D-C Voltage Regulator.

replaces battery B. Such a circuit has the advantage of very small size, absence of tubes, and compactness. Like the VR tube, however, its degree of regulation is small compared to the amplifier-type of electronic regulator. Improved regulation may be obtained by cascading two of the simple regulator circuits in the manner shown in Figure 3. Here, diode D_1 is selected for a higher zener voltage than D_2. For example, E_z for D_1 might be 25 v, and for D_2, 5 or 6 v. The current-limiting resistors, R_1 and R_2, are proportioned with respect to the diode zener currents and the unregulated d-c input voltage.

The same principle may be applied to a-c voltage regulation, provided a diode is arranged for each half of the a-c cycle. Figure 4(A) shows the circuit of an a-c regulator employing a double-ended silicon junction diode (Hoffman 1N429). These units exhibit good symmetry, therefore regulate each a-c half-cycle. Depending upon the value of the unregulated a-c input voltage, the current-limiting resistor, R, is adjusted for a peak alternating current of 7.5 ma through the diode. The dynamic impedance of this diode is 10 ohms average. The regulated voltage drop across the diode is 6.2 volts peak.

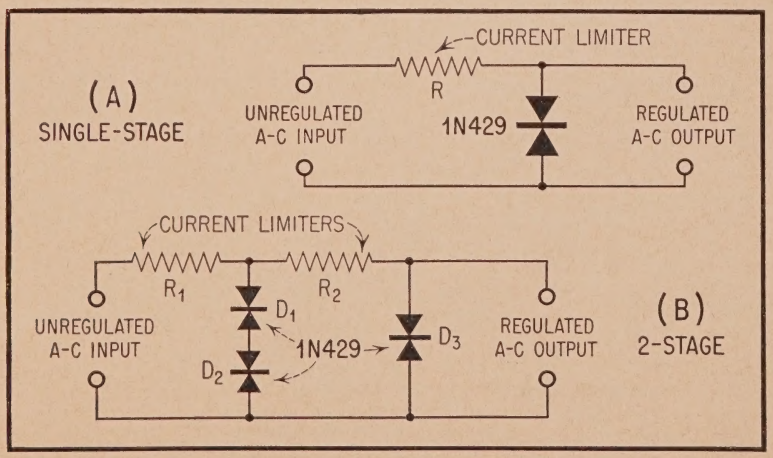

Fig. 4. A-C Voltage Regulators.

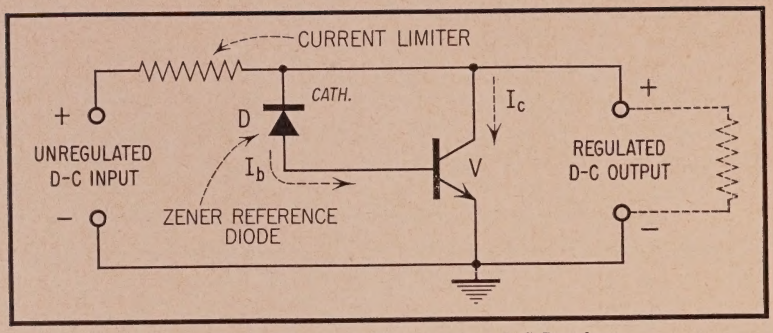

Fig. 5. Diode-Referenced, Transistorized D-C Regulator.

In Figure 4(B), two of these a-c regulator circuits have been cascaded for improved regulation. Two double-ended diodes, D_1 and D_2, are employed in the first stage to handle the higher voltage of that stage (12.4 volts peak). Current-limiting resistor R_1 is adjusted for 7.5 ma peak through diodes D_1 and D_2 in series, and R_2 for 7.5 ma peak through diode D_3.

The zener diode also finds application as the voltage reference unit in transistorized d-c voltage regulators. Figure 5 shows a circuit of this type in which the transistor provides shunt regulation. Base current, I_b, flows into transistor V whenever the d-c output voltage exceeds the zener voltage of diode D. The base-to-collector current amplification of the transistor gives rise to a larger current flow, I_c, into the collector. This latter current, in turn, causes an increased voltage drop across resistor R, and this reduces the

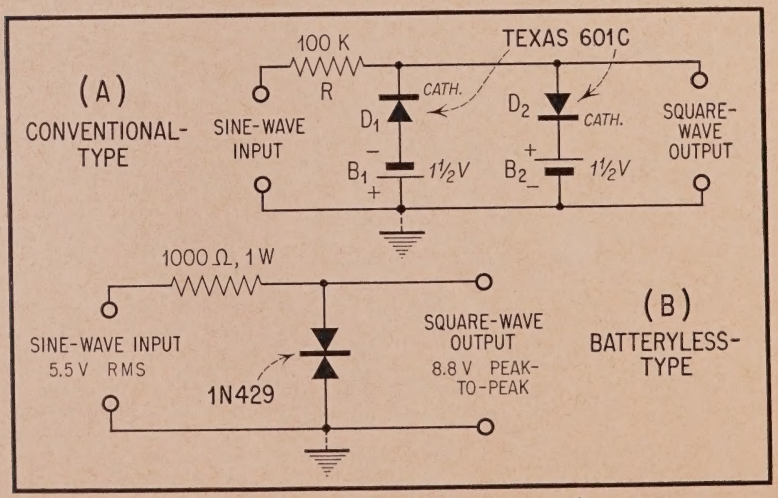

Fig. 6. Limiters (Square-Wave Converters).

output voltage. In this way, the d-c output voltage is regulated against both load and supply variations.

For a more detailed discussion of transistorized regulated power supplies embodying zener reference diodes, see **Semiconductor Regulated Power Supplies**, C-D CAPACITOR, March, 1957.

Limiters (Square-Wave Converters)

The familiar diode-type limiter (square-wave converter), Figure 6(A) is improved in operation by use of silicon junction diodes. The advantage is two-fold: (a) The greatly improved front-to-back resistance ratio of the silicon diode improves the squareness and symmetry of the output wave by virtually eliminating all back conduction, and (b) the extremely low reverse-current flow through the diodes in series (of the order of 0.02 to 0.03 microampere) makes an ON-OFF switch unnecessary.

Figure 6(B) is an interesting limiter circuit requiring no batteries. The required d-c bias is furnished by rectifier action in one half of the double-ended diode. (Hoffman zener reference type 1N429.) This circuit has the slight disadvantage that it requires an appreciable operating current, 5.5 ma rms, since it is operated at the zener voltage of the diode. On the other hand, it has a low dynamic impedance — of the order of 10 ohms.

Diode Balanced Modulators

Matched silicon junction diodes can effect improvements in the performance of ring and bridge-type balanced modulator circuits. Figure 7 shows the bridge-type modulator.

The excellent front-to-back ratio of the silicon junction diode acts to reduce the distortion generated in the circuit, and allows more complete suppression of the carrier.

Diodes chosen for this application should have zener voltages high enough to be beyond the highest negative peak voltage of the carrier or modulation components employed. It is advantageous also to employ types having the highest forward conductance.

Sharp-Pulse Generator

Figure 8 shows a silicon-diode circuit for converting a sine wave into a series of sharp, narrow, negative-going spikes. Such pulses may be employed for timing, synchronizing, gateing, and similar purposes. This circuit gives results comparable to those afforded by a differentiator but employs no frequency-sensitive components. The advantage obviously is that this circuit is not limited in operation to a comparatively narrow band of frequencies. Diodes employed are D_1 (Raytheon 1N439A), used here as

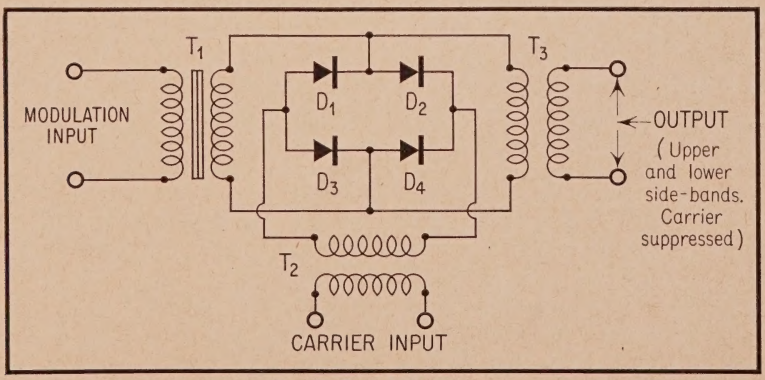

Fig. 7. Bridge Modulator.

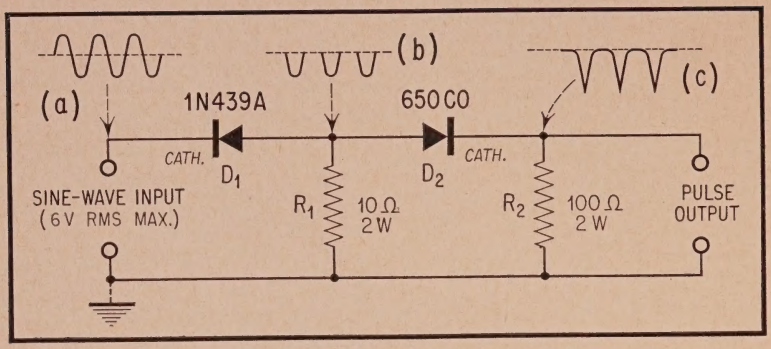

Fig. 8. Pulse Generator.

a rectifier with negligible back-swing; and D_2 (Texas Instruments 650C0), used as the zener diode.

A sine-wave signal (a in Figure 8) is applied to diode D_1 which serves only to provide half-wave rectification. The indicated polarity of this rectifier provides negative current pulses. These develop a corresponding series of negative voltage pulses (b) across load resistor R_1. The latter pulses are applied to the cathode of diode D_2. This diode has virtually no output until the amplitude of the applied pulse attains its zener voltage, whereupon D_2 conducts sharply and a corresponding narrow-pulse current flows through resistor R_2. The voltage drop across R_2 is a series of narrow, negative spikes, as shown at c.

Protective Diode

In high- or medium-resistance systems in which a d-c voltage must not exceed a certain value, a zener reference diode may be used for protective purposes. This diode is chosen to have a zener voltage coinciding with the maximum allowable voltage of the circuit, and is connected across the voltage terminals — anode negative.

At all lower voltage levels, the diode acts like a resistance of several megohms and does not upset circuit operation. At the zener voltage, however, the diode resistance drops sharply to a low value which acts as a short circuit to the voltage increase.

The same scheme may be employed to protect relay coils, make-and-break contacts, and similar components from inductive kick-backs. A zener diode operated as a shunt will provide overload protection for a d-c meter but, at the same time, will alter the scale of the instrument so as to require a special calibration.

Silicon Diodes in Switching Circuits

The low reverse current of the silicon junction diode offers advantage in switching circuits, such as those employed in simple electronic switches for cathode-ray oscilloscopes, coincidence counters, and logic circuits for digital computers. Because of the junction capacitance, however, it is to be expected that switching speeds, as evidenced by rise and fall times, will be somewhat slower than with point-contact diodes.

The zener characteristic may be utilized in the clamping of transistorized pulse amplifiers by connecting the zener diode at d-c potential in the output circuit of the transistor.

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SELL CHEAP — Portable TV tower. 0 to 60', crank-up, on trailer. Jack's TV, Bedford, Iowa.

SELL OR TRADE — BK 401 Brush tape recorder, good cond., no mike, $25; HRO-5, bandspread coils for 80, 40, 20 and general coverage coils JA, JB and JD, Q multiplier, $140, or swap toward SX-100. M. Goodman, 2621 Burns Pl., Union, N. J.

WANTED — Portable potentiometer for checking and calibrating, preferably 0 to 100 millivolts, any make, in fairly good cond., and reasonable. Herman Bruder, 310 Vermont Ave., Irvington, N. J.

FOR SALE — Recent RTTA Correspondence Course; Radio, TV, FM, Mathematics and FCC Preparation, 143 lessons, $35. Joseph Battista, 195 Linden Ave., Verona, N. J.

FOR SALE — Hallicrafter S38C, 3 months old, used very rarely, $38 postpaid. Marder, 3820 13th Ave., Brooklyn 18, N. Y.

SELL OR TRADE — Hallicrafter S20R rcvr; TBY 10 and 6 meter transceivers; 50 w. Navy GWY-2 xmitter; Kodak 2¼ x 2¼, f3.5 twin lens reflex. Interested in good rcvr, xmitter, mobile equip. S. Wynstock, 2257 10th St., Douglas, Ariz.

SELL OR TRADE — 2¼ x 3¼ Busch press camera and solar enlarger 2¼ x 3¼ complete for radio and TV test equip, best offer. Daniel J. Bellino, 5537 So. New England Ave., Chicago 38, Ill.

FOR SALE — Police mobile rcvr, 2 to 4 mcs, $15; whip antenna with spring mount, $10; Premax beam, $25; complete mobile station, $45, or swap for 30-50 mc FM gear. Higley, 82 Lower Main St., Matawan, N. J.

WANTED — 2-50 Mc rcvrs with squelch; Jap A1WA-M18; BC-1306 rcvr. Felders TV and Radio Service, Tylertown, Miss.

WANTED — Seco grid leak tester; Sam's Photofacts and Wallace's schematic diagrams in good cond. Send list and lowest prices. Roy Goodwin, North Dr., R. 1, Ben Hill Station, Atlanta 11, Ga.

FOR SALE — Yoke, MV metal shield for 15GP22, $8; 50o yokes, 50c each; RCA 630 chassis, $5 or parts; misc Photofacts, $1 each. Want tape recorder, need not be working; used tape. Al Svirmic, 2512 W. 69, Chicago 29, Ill.

FOR SALE — Arkay sig. gen. SG-2, working, 1 year old with leads, $15 and postage. W. B. Jones, Carnesville, Ga.

FOR SALE — Hallicrafter 49 FM civic patrol rcvr, 30 to 50 Mc, slightly used. H. H. Riley, Rt 4, Box 346, Aiken, S. C.

WANTED — Wire or tape recorder, working or not. Must be cheap. Fauke's Electric Co., 1350 Fairfax St., Carlyle, Ill.

SWAP — Like new Sprague Kwik Test capacitor checker KT1, for 6 and 12 battery eliminator or RF or AF signal generator. A. T. Knapp, 404 West 5th St., Elmira, N. Y.

FOR SALE — Best offer: BC-223 xmitter complete with tuning units and power supply for 12 and 24 v., in good cond. Bud Broaddus, 241 E. Eckman St., South Bend, Ind.

FOR SALE — Stancor model 752 power supply; Simpson 335 tube checker, and 340 AM signal generator; Heathkit 5" scope. Ralph Bartels, Sunnyland Trailer Park, 129 NW 79th St., Miami, Fla.

SELL OR TRADE — "Cathode Ray Tube at Work," and "Servicing Receivers by Means of Resistance Measurement," both by Rider. Perfect cond., best offer, or trade. John Rosoh, 28 Winans Ave., Newark 3, N. J.

FOR SALE — Good 156 Hickok trace meter, test leads and instruction book included, $35. Long's Radio Service, Leon, Iowa.

WANTED — 15 meter, 3-element beam antenna. J. Henrichsen, Desnoyer's Hardware, Clark, S. D.

WANTED — Service manual or schematic for 21" TV built by American TV, Inc., of Chicago. 16 tubes plus pix tube, 11-prong socket for yoke; No. 9449. C. A. Lanham, 404 W. Union, Bloomington, Ill.

WANTED — Stoddard NM-20-B; Clark 106; RCA 301-B and WX1A. Robert Roske, 45 Hastings Ave., Pawtucket, R. I.

WANTED — Tape recorder, 2 speeds. Charles C. Scrobola, 312 So. Camac St., Philadelphia 7, Pa.

FOR SALE — Superior UT-50 utility tester and 247 tube tester; Peaco FM kit; coin operated pay meter; Royal American field glasses, 3 x 40. Benson T. Hodgen, RR. 5, Frankfort, Ind.

FOR SALE — Gammatron HK-254 tube, fil xformer and socket, capable 750 w. input, $10; Cardwell dual section transmitting condenser XC-75-XD, 5000 v. spacing, $8; 10FP4 picture tube, $9; parts for Zenith 28T925-R TV. Edward Woodson, 921 First Ave., Beaver Falls, Pa.

FOR SALE — Eico 460 5" scope, factory wired. Never used, sacrifice $120; additional accessories: low cap, direct, and demodulating probes at half price, $7.25. Jack P. Jowe, 663 Peralta Ave., San Francisco 10, Calif.

SELL OR SWAP — For 5" oscillograph, Philco 7008 visual alignment generator for TV and FM alignment and 7070 RF signal generator. Charles Gottlieb, 1248 Lexington Ave., New York 28, N. Y.

SELL OR SWAP — "Elementary Radio Servicing," Wellman and "Elements of Radio Servicing," Marcus-Levy. Want Modern Oscilloscope, Radio Handbook, TV-Video Handbook by Boyce and Roche; Hickok tube tester; Heath T-S4, A-G8, S-G8. Frank Wayne, 1012 Bill Rd., Schenectady 3, N. Y.

FOR SALE — E. H. Scott rcvr type CZC 46209, 11-tube, 80-560 Kc., 1.9-24.0 Mc., 1. n. Make offer. A. F. Zamsler, Jr., 8440 Jeff Hwy., New Orleans 23, La.

FOR SALE — 6 Sel-Son CS-5 CRT substituter, never used, $25; Heathkit BG-1 TV bar generator, 1. n., $10 fob. Lee's Electronics Service, Henagar, Ala.

SELL OR SWAP — Xformers, chokes PE 103, power supplies, xmitting tubes. R. V. Rosellini, 2619 South Gaylord, Denver 10, Colo.

FOR SALE — Crystal 710S Rex microphone, with switch, for $8, never used, guarantee included. Mrs. Wm R. King, 7 Oregon Pl., Buffalo 7, N. Y.

FOR SALE — Argus color camera, 35mm, built-in photo electric exposure meter, $15 delivered; Triplett 1613 tube tester, $5 fob; Test-Rite RF signal generator B-45, $15 delivered, or swap? Harold H. Moon, 611 Oneida St., Fulton, N. Y.

FOR SALE — Good rcvr at half price, 5 bands, operates on 110 v. and battery, $75; Zenith transoceanic 8G005TZ1. Write for details. Leonard Heath, 334 N. Center St., Plainfield, Ind.

WANTED — Good handkey, earphones, "bug" and code oscillator. State minimum price. M. Welsh, 9 Gardner Rd., Cambridge 39, Mass.

FOR SALE — 300 TV and radio tubes in original cartons; Sprague Tel-omite condenser checker; signal generator; Precision meter; condensers, vibrators, volume control, resistors, 14 vols. Riders, 158 Sams, like new, $350. Wm. Scott, 20 Cherry St., Oneonta, N. Y.

FOR SALE — Antenna, 14 Mc. doublet with 65 ft. RG8-U coax cable, $5; Heathkit test equip. with manuals; GI sig. gen., $15; 04 scope, $25; V-4A VTVM, $15; Philco 7050 tube tester, $30. W. D. Gilley, 4316 McMillen Pk. Dr., Fort Wayne, Ind.

SELL OR TRADE — S-38 rcvr, surplus equip., TV-Radio-Phono. Need scope and Hi-Fi. O. Smith, 41 W. Lakewood Ave., Milltown, N. J.

URGENTLY NEEDED — Circuit diagram for Epariphone Zephyr Elect. amplifier, has 6 tubes, 12" Jensen concert speaker. Bill Hagara, Box 305, Slickville, Pa.

FOR SALE — Wire recorder W-C 80 mounted on 15 w. PA amp., $25; Riders TV-1, $5; misc Sams, $1 each. IAl Svirmickas 2512 W. 69 Chicago 29, Ill.

FOR SALE — Model 274 Dumont 5" scope, l. n., with manual, $50., express collect. G. E. Howarth, 216 1st Ave. East, Oskaloosa, Iowa.

FOR SALE — Tempco 250GSC xmitter, 220 v. as is, 250 w. output, 2-16 Mc. Crystal or ECO, $475; PE-103 dyna., $27.50; Jackson TVG-2 gen. excellent, $230, fob. Wm. J. Shaw, 18409 Windward Rd., Cleveland 19, Ohio.

FOR SALE — Supreme 456 3" scope and manual, $20; Heath SG-6 RF sig. gen. and manual, $12 fob. L. M. Koons, San Jon, N. M.

FOR SALE — Still in original packing with spare tubes, parts, crystals, cords, etc., BC604, $15; T17 carbon microphone, $5; DM35 dynamotor, $10; HS30 headset, $3. Michael Tuberosa, 50 Barnes Ave., E. Boston 28, Mass.

FOR SALE — Several 25c coin meters, good working cond.; RCA and Detrola 78 automatic record changers, perfect cond., reasonable. M. J. Sugar, 145 Temple St., Hartford 3, Conn.

WANTED — Instruction manual for Silver capacitance-resistance bridge. Will pay postage. M. S. Posey, 607 4 St. NW., Apt. 14, Washington, D. C.

WANTED — Code practice equip. Marie Welsh, 1228 Cambridge St., Cambridge 39, Mass.

SWAP — 802-803-813 tubes, modulator components, several power supplies, binoculars, 4 x 5 compur shutters, f4.5 lens, etc., for Johnson Matchbox, VFO, Balun coils, SWR bridge. H. E. Leigh, Sr., 828 Nevada Ave., San Jose 25, Calif.

SELL OR TRADE — 1925 Freid-Eisman, AC. Dayton radios; Edison cylinder Victrola; Craftsman welding-cutting torch; Skan exposure meter; 10" Westinghouse TV. Want test equip., community TV equip., or parts; field strength meter. G. L. Shriver, Sr., Rt. 1, Ridgeley, W. Va.

WANTED — 2 or 3" Cathode Ray tube; 3KP1, 3AP1, 3BP1, 2AP1, 2BP1, etc. State cond., and price. Back issues CQ, QST & GE Ham News. Jeff Jacobs, Box 7216, Atlanta 9, Ga.

FOR SALE — "Radio & TV Receiver Trouble Shooting and Repair," and "Receiver Circuitry and Operation," by Ghirardi and Johnson. Both for $8. John Buckman, 905 3rd Ave., Nebraska City, Neb.

SELL OR SWAP — Mark II xmitter-rcvr, l. n., 5 condensers 1000 mfd at 90 v.; Eimac 4-125A tubes used very little; 50 w. novice xmitter; Webster-Chicago wire recorder, like new; for cash or tape recorder. Don Petermann, 81 Bedford Rd., Dumont, N. J.

FOR SALE — Eico 360 TV sweep gen., factory wired, $20 plus transportation. Sorensen Speaker Reconing Service, 545 4th NE, Mason City, Iowa.

WANTED — Solar CF 1-60 exameter with leads and manual. State cond., and cash price. A. Orlowski, 54 Penton Blvd., Duluth 8, Minn.

FOR SALE — Precision 10-12P and E-200-C, both like new cond. Best offer. Sams Photofact TV course, $1.65 ppd. G. E. Tripp, 1312 11 St., Rock Valley, Iowa.

FOR SALE — All kinds Radio and TV condensers, resistors, volume and tone controls, tube sockets, 30 tubes, Sams, Instruction books, tube tester, signal injector, 2 radios, speakers, and soldering iron. First $50 takes everything. Ron Bosom, Holt, Mich.

FOR SALE — RME DB23 ham band preselector, $40. Frank Ginex, 22 Melville Pl., Irvington 11, N. J.

TRADE — NRI VTVM; Knight in-circuit capacitor checker. Need 2-meter rcvr; Hi freq. FM rcvr; mobile converter. N. B. Bowerman, 1520 Plank Rd., Jeffersonville, Ind.

WANTED — Sam's auto radio manuals, photofacts, radio & TV textbooks, must be reasonable. Roger Allen, Box 121, Montebello, Calif.

FOR SALE — 813 xmitter with 200 w. output; Micamold xmitter with 45 w. output; VFO; Sonar CFC; electronic parts all for $150. M. Goldman, 1806 Church Ave., Brooklyn 26, N. Y.

WANTED — Used amateur xmitters and rcvrs from private owners, also TG34A keyers and tapes. Local only. Bill Welsh, 306 Prospect St., Cambridge, Mass.

FOR SALE OR TRADE — National NC-44; Comet Pro and Zenith Transoceanic rcvrs; Riders and other books and manuals. T. Glenn Watt, 415 W. First St., Chanute, Kan.

FOR SALE — Radio books, tubes, radios; Craftsman heavyduty sanding machine. Revere P-48 16 silent projector, $95, l. n., pair 35mm sound and pair 35mm silent projectors; Universal 35 newsreel camera 200 ft. capacity. P. J. Calderaro, Wakefield, Mass.

WANTED — Rek-O-Kut recording turntable V-16; TR-12H; Recording Lathe M-5S. Must be in excellent condition. Event Records, 10 Hardy Rd., Westbrook, Maine.

WANTED — Used ham rcvr with bandspreads in good cond. State model, age and price. Local only. Seymour B. Kramer, 2851 Sedgwick Ave., Bronx 68, N. Y.

FOR SALE — Eico HF60 Hi-Fi amp and 61A Hi-Fi master control, both for $100. Ready to use. Delivery if local. Henry Peplinski, 153 India St., Brooklyn 22, N. Y.

SELL OR SWAP — 30 x 40 movie screen, 16mm film, radio mags, speakers, tubes, transistor amp audio 3 x 1". Want tape recorder, Hi-Fi player, wrist radio; TV set, FM radio. Harry Kuell, 18½ Thomas St., Newark 5, N. J.

FOR SALE — Sylvania TNT tube caddy, l. n., $18; Philco portable scope, $30; Chicago Industrial Ins. Co. VTVM, $25. All for $70 cash. Dominick Colabella, 23 Congress St., New Rochelle, N. Y.

FOR SALE — Harmon Kardon A-310 tuner and C-300 amplifier; Bogen B50 turntable; Recoton 500SD; Bozak B-207A, B-209, N-101 crossover; B-305 enclosure; $375; BC-1031-A panadaptor, $50; 1KW push-pull 250TH xmitter, $400. P. Valente, 5 Summit Ter., S. Peabody, Mass.

FOR SALE — DX100; NC125 plus Heath Q multiplier; Gonset supersix and superceiver; Babcock mobile xmitter plus 6 v. vibrator supply; RME DB23A. Make offer. Dolph Tanzer, 4272 Kepler Ave., Bronx 70, N. Y.

TRADE — 5 KW Onar gen. 110 v. AC, 60 cycles, powered by Continental 4-cylinder gas engine all in one housing. Want Hi-Fi, tape recording and playback equip. Bob Farmer, Plainview, Tex.

FOR SALE — Pentron HF-400 tape recorder, factory warranty, $170 delivered; Professional 17" disc recording lathe, $100; excellent RCA 25 w. amplifier & cage, $25; RCA dual chassis model 80 Radiola, good cond., no cabinet, $12. John Moore, Box 63, Seneca, S. C.

FOR SALE — Edison Phonograph (1898) with 50 cylindrical record horns, etc., good cond., $50. Robt. Champlin, Jr., 131 Bryant Ave., Springfield, N. J.

SELL OR SWAP — VHF booster, $15; UHF convertor, $8; auto radio, $5; Radio World magazines. Edward Grochmal, 86 Gillgan St., Wilkes Barre, Pa.

WANTED — 630-TS chassis for use with training course, reasonable. State price, cond., and ability to ship, if not in Chicago area. John W. Ryan, 3823 N. Page Ave., Chicago 34, Ill.

FOR SALE — Knight Quick-check capacitor checker, $10; Heathkit LP-1 Linearity Pattern generator, $20, perfect cond. W. J. Wengler, 311 Preston Ave., San Antonio 3, Tex.

WANTED — Scott RCH marine rcvrs; Collins 51S communication rcvr. Lloyd Rondeau, 2436 Carney Ave., Marinette, Wis.

FOR SALE — NC-57 rcvr; TBS-50A trans., Meissner EX signal shifter. J. Tift, Box 193, Hooksett, N. H.

WANTED — Gisin's TV Trouble Tracer books; instruction manual for Lee Serviset; Versamatic or Babco speed reducer attachment for ¼" electric drill. Leo Adas, 1842 No. Keystone Ave., Chicago 39, Ill.

SELL — Fisher 80-C Master audio control, new cond., $85; Webster 50-watt audio amplifier, $50; RCA-Victor 45-rpm record-changer, amp., $25; Timex magnetic recorder, $25. V. R. Hein, 418 Gregory, Rockford, Ill.

WANTED — Used recording tape, large or small quantities, also empty reels. Dick Lackner, 2029D Bradley, Chicago 18, Ill.

WANTED — 16 mm movie projector such as Apollo-500 or Excell Streamliner; also want 40 to 50 watt amplifier. Have Hi power binoculars, TV test instruments, also cash. John Arnold, Box 84, Bluffs 3, Ill.

SELL OR TRADE — Simpson 260 VOM, good less strap, $25; Hallicrafters S-38, exc., $30; condensers, mica, 5,000 v. test, .002 or .004, three for $1. All postage paid. Gene, 1001 Merritt St., Old Hickory, Tenn.

SELL OR TRADE — Dumont 241 lab scope, exc. cond., $150 or trade for Gonset communicator. S. Consalvo, 4905 Roanne Dr., Washington 21, D. C.

FOR SALE — Latest model mutual conductance tube tester Electronic Measurements No. 206P, in portable oak cabinet, in orig. carton. Bargain at $60 FOB. Walt Bartell, 5536 Wilson Ave., Chicago 30, Ill.

FOR SALE — Millen R9er, coils for 10-11, 15 and 20 meters, $20; Audio Engineering mags., Oct. 52 to April 56; TV-Radio Service Dealer Oct. 52 to Nov. 56, except Jan. 56. Make offer. Herbert Greenberg, 821 Rutgers Rd., Franklin Square, N. Y.

FOR SALE — Airline 3-speed portable record-changer, $25; Weston Master III exposure meter, $25; GE 3-way portable radio, $10, and RPX-050 magnetic cartridge, $5. All new condition. Mrs. Carolyn Bargen, 3007 Rice Ave.; Rockford, Ill.

SELL — Early model Westinghouse 12" TV, 2 wide band channels plus channels 2-13, works good, best offer over $40. Norman Webb, 15 West Main St., Holcomb, N. Y.

WANTED — 2 General 314 Radio potentiometer 10,000 ohm, wirewound; National EMC 250 mmfd variable condenser; 4 gang 440 mmfd variable condenser, suitable for audio oscillator; 3 pieces 15" sq. phenolic or Bakelite 3/32 or 1/8" thick. John T. Deavereaux, 940 Everett St., El Cerrito, Calif.

FOR SALE — Factory wired Globe Scout 65, in exc. cond., with instruction book, $65 FOB. Will take Heath AT1 on trade. Lawrence Lewis, Aberdeen, Idaho.

WANTED — 45 rpm spindle for Admiral record-changer RC221, Admiral part No. 9400B329. C. Keber, 40 Dudley Drive, Bergenfield, N. J.

SELL OR TRADE — RTTA Radio-TV Technician course 118 lessons with RF sig. generator kit, 1955 edition. Best offer, or trade for 3" scope, 6-12 v. battery eliminator, 7JP4, or what have you? H. C. Hollwedel, 112 Cresthill Ave., Tonawanda, N. Y.

FOR SALE — Hallicrafters S76, no spkr., $75 FOB. Robert Schmauss, 3903 Swann Ave., Tampa, Fla.

SWAP — NC57 comm. rcvr, for 5" Heathkit scope, tape recorder, or what have you? E. Taffe, Jr., 222-3rd St., Palisades Park, N. J.

FOR SALE — Eico 320 sig. generator, $12; Webcor 3-speed changer with GE cartridge, $24; Utah 12" high frequency speaker in Hi-Fi enclosure, $16. John P. McCullen, 3050 Bainbridge Avenue, Bronx 67, N. Y.

FOR SALE — Weston Master II, Riders 12, Photofacts 1, 2, 4. Want SW rcvr, ATM material or?? Lui-Lektrik, Woodward, Iowa.

TRADE — Magazines: Radio Age April 1924; Television 1927; Radio & Hobbies Sept. 1947 (Australian); Radio Craft Jan. 1947 (special DeForest issue); Radio Craft March 1938 (Jubilee No.); ARRL call book 1947. Make offer. W. G. Eslick, 2607 E. 13th, Wichita 14, Kan.

FOR SALE — Like new Lettine 240 transmitter, $65; 457-A converted with two 807's, push-pull, Class B modulator, separate power supplies, 75 meter, $55. Jack Burleson, c-o Clerk's Box, U. S. Post Office, Johnson City, Tenn.

FOR SALE — Battery radios, std. bdcst and SW: Truetone 6-volt $5, Watterson 6-volt $4, Crosley 1½-volt $5, all good condition. Williamson Radio Service, 631 W. Dallas Ave., Cooper, Tex.

FOR SALE — West. Elec. Altec 639A mike, little used, in orig. box, $89; mounting cradle and mike stand adapters, $10 additional — FOB. C. E. Parker, 771 Sycamore Dr., Port Hueneme, Calif.

WANTED — Parts for Bendix RTA-1B (ARC-9). Need rack, plugs, and control head. LeRoy D. Lawhorn, ComServPac, W4V1W/KH6, Box 28, c-o FPO, San Francisco, Calif.

SELL OR TRADE — In perfect condition: Regency RC-53 UHF conv., Eico 145 sig. tracer, Smith & Wesson 38 cal. 5 shot revolver. Want test equipment. Luke Strader, 1217 Myrtle Ave., Danville, Va.

WANTED — Hallicrafters S-38-type rcvr. S. A. Balkan, 166 Winchester St., Newton Highlands 61, Mass.

FOR SALE — 80-10 m., 60-65 w. ham xmitter, Collins PTO, constructed in 3 units, can be rack mounted. Details and price FOB on request. Florida only. Floyd Gray, Jr., 241 Gray St., West Palm Beach, Fla.

FOR SALE — Babcock radio control transmitter, receiver escapement. Also Piper Tri-Pacer plane and engine. All perf. condition. Joseph Lynn, 1711 Morris Ave., Bronx, N. Y.

WANTED — Used Geiger counter. A. E. Lamping, 133 Ivory Ave., Pittsburgh 14, Pa.

FOR SALE — Hallicrafters S-38-A, like new cond., broadcast plus 3 short-wave bands to 32 mc. Also antenna coupler for above set. $30 for both. Klaus W. Engel, 1616 Haight Ave., Bronx 61, N. Y.

FOR SALE — 610A Hickok sweep, $85; Precise 635 Universal audio gen., $24 both with inst. Val Obal, 4165 "J" St., Omaha 7, Neb.

ATTENTION — Riders Vols. 5-9 and 13, new condition except 5; Sams Volume covering Photofacts 7 thru 12. $50 for all. Will not ship. William H. Henshaw, 46 Front St., Tarrytown, N. Y.

WANTED — Motor for rotary beam with indicator; also Beam, operation on 10, 11, 20, 40, 80, 160 meters, three element beam preferred. Ron Marx, 1307 Boscobel Ave., Bronx 52, N. Y.

WANTED — 80 meter B&W HDVL coil. Cash or will swap parts. Gordon E. Hopper, 75 Kendall Ave., Framingham, Mass.

WANTED — UHF converter, cheap and working; also a 6-12 v. battery elim. in kit form. Have assorted radio-TV parts, tubes, cheap. Franklin Greene, 310 East 5th Ave., Knoxville, Tenn.

FOR SALE — Simpson 303 VTVM, 1. n., with probes, manual plus carrying case and RF probe. Local only. L. J. Sartan, 45-43 158th St., Flushing, N. Y.

FOR SALE — Electro-Voice V-2 microphone. J. Dunbar, 1234 16th Street, Parkersburg, W. Va.

FOR SALE — Hickok 610A TV FM sweep gen., $125; Dumont 208B scope, $100; Precision ES500 scope, $100; BC-221 with manual, $25. L. E. Mumola, 309 West 19th St., New York, N. Y.

WANTED — Good 120 watt modulator with xtal input. Cash or trade on 20 watt Heathkit Hi-Fi. George Leininger, 16412 Marquis Ave., Cleveland 11, Ohio.

FOR SALE — Unused Hamilton 6 or 12 v. 35 w. mobile PA system, 2-VH91 spkrs and Shure dynamic mike, cost $167. Make offer. Fred Klotter, 6944 West Bryn Mawr Ave., Chicago 31, Ill.

WANTED — Riders manuals 16 up; bar generator, audio generator, scope, Scott radio, test equip. Cardona Radio Shop, GZB-10, Puerto Nuevo, Puerto Rico.

FOR SALE — Dumont 208B 5" scope in very good operating cond., $65; CREI Advanced Radio Engineering course, $45, or best offer. Consider trading for good BC-221. FOB. Julian E. Scaruffi, 3321 N. Karlov Ave., Chicago 41, Ill.

WANTED — Good audio sine and/or square wave generator. Also need IM distortion analyzer. Bill Watson, 96-01 133 Ave., Ozone Park 17, N. Y.

WANTED — Hi-Fi set-up with 20 or 25 w. amplifier, 3-speed record changer, tuner, speakers. H. Levine, 109-03 225th St., Queens Village 29, N. Y.

FOR SALE — Collins 32-V2, $350; Viking II with matched Johnson VFO; RCA 6 v. 40 w. complete mobile xmitter, with cables, mike, dynamotor, $65; Gonset Tri-band conv., $25; Sprague Kwik-test KT-1 condenser checker, $20; 4X150-A tube. Fred Kloepper, 649 West 23rd St., Lawrence, Kan.

SELL OR SWAP — BC-221 freq. meter, less cabinet; SCR-522 rcvr (BC-624C) electronic squelch with tubes; SCR-522 rcvr (BC-624AM) relay squelch, all tubes less output xformer. Want Central Electronics model B Slicer, kit or wired, or $65 for lot, FOB. R. A. Owens, 1600 SW 68th St., Oklahoma City, Okla.

WANTED — National FB-7 or FBX with coils; also AC SW-3 and/or coils. Cash or trade. F. C. Janda, 267 Coe Rd., Clarendon Hills, Ill.

FOR SALE — Regency RC-53 converter, exc. cond., $10 plus shipping. H. M. Andrews, Rt. 3, Orchid Dr., Greenville, S. C.

FOR SALE — 1950 Dodge model 803 radio; Gonset 6-meter 12 v. communicator; Sonar MR3 rcvr; MB26 2 meter xmitter; Gonset 2 meter converter; E400 sweep gen. A. Turturro, 146-26 No. Hempstead Tpke, Flushing 55, N. Y.

WANTED — Used Minifone or other miniature recorder in good working cond., and reasonable. John O. Hehn, 18 So. Jardin, Shenandoah, Pa.

FOR SALE — Unused ¾ hp 115 v. AC ball-bearing motor, $35; 5x50 binoculars and case, $5.95 pp.; oscilloscope, $15. Also many technical books. J. Rotchak, Daley Rd., Lapeer, Mich.

FOR SALE — Granco LCU; Philco 200X UHF conv.; ATR 6 v. auto power supply, $15; VTVM $20; VOM 260 $29; DuMont 208B scope, $75. Want cash, 7" scope, Photofacts from 150. J. Pellock, 8643 Jennings, St. Louis, Mo.

SELL OR SWAP — Six 7" pic tubes; fifty asst. receiving tubes boxed. Need new 45 records or 33⅓ LP albums; or what have you ?? Truch's, 290 Main St., Spotswood, N. J.

SELL OR SWAP — Power supply 800-600 v.; Simpson 0-250 ma meter, TV booster, UTC S43 and PA333 xfmrs, Fil xfmr 6.3 @ 5 amps. Need crystal unit, BC-348. H. McCall, 1207-3rd SE, Canton, Ohio.

SELL — IBM electric typewriter, pica type, $150; Garrard RC-98-4 record-changer, like new, $60; Cascade 2-speed disc recorder-radio-phono, $50. Donald P. Bagren, 417 North Winnebago, Rockford, Ill.

FOR SALE — Unused ATR batt. elim., 6-12 v., model 610C Elid, $25. Frank Pavlica, 50-54 41st St., Sunnyside, L. I., N. Y.

FOR SALE — Tubes: 5-1R5 (Tung-Sol), 2-1S5, 12SK7 and 6F6 (Ken-Rad), 6SQ7 (GE), 12BD6 (N-U), 35Y4 (Syl.). All in orig. boxes, $9 takes all. Edward Summers, 3605 Janet Rd., Silver Springs, Md.

FOR SALE — Precision 612 tube checker, $55; Heath sig. tracer, $20. S. Lustberg, 2333 63rd St., Brooklyn, N. Y.

FOR SALE — Unused gas tube sign transformer, pri. 115 v., sec. 6000 v., 60 cycles, 18 ma, with external line-switch, wt. 12 lbs., $5 COD. O. H. Ketchum, 10125 Flora Vista Blvd., Bellflower, Calif.

SELL OR TRADE — Heathkit RF sig. gen.; RCA M1-4288 50 w. amplifier; Precision EV-20 VTVM. A. L. Friel, 37 Humbert St., Princeton, N. J.

SELL OR TRADE — Triplett No. 1181 oscillator VOM and free point tester, $30; Hickok tube tester diamond point No. 34, $20. Want camera or pocket type VOM. Ernest Heino, 13603 50th South, Seattle 88, Wash.

FOR SALE — Unused 85D Revere 8 mm movie projector with case and wide angle lens, also 8 mm movie camera with case, Universal model G8, f2.5 lens, used. Both for $110. J. Lippane, Box 291, Hoboken, N. J.

FOR SALE — Eico push-pull oscilloscope, Feiler stethoscope, Heathkit RF signal gen., VTVM, portable tube checker, some RTTA and National School lessons. Al Everett, 98 Kingston Ave., Brooklyn 13, N. Y.

WANTED — Revere T-700, T-700D, TR-800, or TR-800D tape recorder. Eugene Kon, 1516 Broadway, Buffalo 12, N. Y.

FOR SALE — 1 kw RCA mod. trans. screen winding, $35; plate trans. 115 pri., sec. 1500 or 1000 v. at 1 amp, $50; two (not surplus) perfect Jennings 10-400 mmfd vac variables, $50 each. All FOB. H. W. Lingenfelter, 21352 Kenwood Ave., Rocky River 16, Ohio.

SELL — 1957 Webcor 2711 tape recorder, perf. cond., tested but unused. Sent collect for $160. Paul Bateman, KGAK, Box 1231, Gallup, N. M.

SWAP — Unused Gonset 2 and 6 meter communicators. Want military TS equipment, BC-348, BC-224, R5/ARN-7, ARC-3. D. E. Cimino, 2246 Betty Lane, Beverly Hills, Calif.

SELL OR SWAP — Norelco projection system: 3NP4 projection tube, 160AT-60 tailpiece, 160A-01 tailpiece, 160A-01 optical box, 160B-1 high voltage supply, instruction manual, never used, best offer. Alfred Witzl, 1645 Campbell Ave., Des Plaines, Ill.

FOR SALE — Heath AT-1 xmitter, $24, good cond. Tom, 180 White St., Danbury, Conn.

FOR SALE — Complete part-time TV repair equipment: Precision 10-54P tube tester and multimeter comb., high voltage probe, tube caddy, 100 tubes, tools, soldering gun, resistors, condensers, boosters, books, etc., $300. Glenn Wiswell, 16 Loretta Dr., Cedar Grove, N. J.

TRADE — Wilcox-Gay disc recordio with mike and PA system, for reflex camera or what have you? Hal Blackman, 8333 Sc. Drexel Ave., Chicago, Ill.

SELL OR TRADE — Stancor isolation transformer type 6160, like new, and Sola constant voltage transformer, Cat. No. 30807, pri volts 95 to 125, freq. 60, volts 115. What have you? Walter Lula, 6622 Howard Ave., Hammond, Ind.

FOR TRADE — ICS Industrial Instrumentation course for test equip. or Riders manuals; also want to buy Century TV dynatracer. Robert K. Smith, 11610 Temblett, Cleveland 8, Ohio.

FOR SALE — Complete DeForest's Radio and TV correspondence course, except for kits, good cond., $25 or best offer. Lawrence Kallstrom, 505 Middle St., East Weymouth 89, Mass.

SELL OR TRADE — Radio parts and test equip. for guns or photo equipment. E. A. McCall, 10004 East 34th St., Independence, Mo.

TRADE — Graflex press camera 4x5 with 5x7 Bauch Lomb series Ic Tessar lens. Want good TV alignment generator, complete with manual. Peter J. Lund, 555 Moscow St., San Francisco 12, Calif.

FOR SALE — Hallicrafters S-47, almost new, and other good radios and spkrs. Ward Merritt, 3 Ernel Dr., Riverside, Conn.

WANT URGENTLY — Tube manual for TE-1 Star Measurements tube tester or place where I can get one. Bob Robinson, 612 Charlotte St., Utica 2, N.Y.

FOR SALE — Viking mobile xmtr. and VFO, Gonset 3-30 conv., Gonset noise clipper, Carter genemotor power supply, and 10 and 75 meter whip antennas. Send money order for $100, will ship postage paid. Eugene Cheney, Nora Springs, Iowa.

FOR SALE — Over 400 resistors all popular values, ½-10 watts, separated into values; also more than 100 condensers plus pots, electrolytics, etc. Best offer over $18 takes all. Murray Schiffman, 7540 Austin St., Forest Hills 75, N. Y.

SWAP — NRI radio course for 8 mm movie projector (forward and reverse speed), or 5" scope high gain or Superior TV50 genometer, all in good working cond. Henry Platek, 128 Marshall Ave., Pittsburgh 12, Pa.

SELL OR SWAP — Assorted selenium rectifiers, tubes, phono needles, detents, Stancor tube brighteners; Mallory 6 v. elim.; Precision tube checker; Sparks sig. tracer, for cash or photo equip. John R. Waldowski, 5413 W. Alexander Pl., Oak Lawn, Ill.

FOR SALE — Almost new National NC-125 with 5" spkr, 4-band amateur radio instruction book, $185. Will deliver within 25 miles. Perfect Tokavox intercom, master and remote unit, 100' wire, 3 tube amp. 5" spkrs, $35. Charles R. Graff, 6640 Edmund St., Philadelphia 35, Pa.

WANTED — Tubes: receiving, xmitting, TV, special purpose, etc. Will pay cash. William Schechter, 62 Cortlandt St., New York 7, N. Y.

SELL OR TRADE — Meissner 4E tuner condenser and 5 shielded coils, $5; Weston 414 AC galvanometer, $5; NRI Practical TV Servicing, 2 vols., $1; Pilot 5G5 FM tuner, $40; DeWald FM tuner, $15 prepaid. The Toll House, Box 46, West Cornwall, Conn.

SELL — Unused Gotham 3 element, 20-meter standard Gamma-match beam, $25; CSC 5-watt audio amplifier, with mike-phono mixer, $12; Knight VFO, exc. wiring job, $22. Karl Thurber, 247 Hamilton Rd., West Englewood, N. J.

FOR SALE — Precision model 612 tube and battery tester, good cond., with latest roll chart, $55; like new Philco Transitone radio, in red plastic cabinet, $10. You pay postage. L. E. Smith, R. 1, Trion, Ga.

SELL OR SWAP — Eico sweep gen., Heath Hi-voltage probe, assorted tubes, miscellaneous Telaides, Sams, servicing books, ham items. Want mobile convertor, Lo-power commercial xmitter, 3-speed changer, Hi-Fi amp. Ed Stevens, 221 Central Ave., Cortland, N. Y.

SELL OR SWAP — DC to AC convertor input 110 DC, output 110 AC 50 watts. Any reasonable offer, or for TV tubes. Peter LoCascio, 1725 61st St., Brooklyn 4, N. Y.

FOR SALE — Hallicrafter S40A, $50, or trade for phono player. Chas. Wendell, 63 Forest Hill Pkwy, Newark 4, N. J.

SELL OR TRADE — Perfect Eico 425K scope, $40 FOB; A eliminator $12; Radio City HM sig. gen., $12; Black and Decker screw driver, $15. Need modern tube checker. Sam Berenblum, Greenwich, Conn.

FOR SALE — Complete Cortina Academy Spanish language teaching course with books and three speed "Concert Hall" record player and volume of records. Course and record player never used, $90. Thomas LaBeck, 861 Glen Arbor, Dallas 32, Tex.

SELL OR TRADE — Heath Q-multiplier in perfect cond., $8, no shipping. Louis Tonik, 1505 N. 6th St., Philadelphia 22, Pa.

FOR SALE — Ampro 730 tape recorder in good working cond., $45 FOB. H. Bell, 3917 Ely Ave., Bronx 66, N. Y.

WANTED — All wave band (European and American) radio or communications receiver with speaker in good used condition. State particulars and lowest price. D. Landesberg, 179 Marcy Ave., Brooklyn 11, N. Y.

SWAP — Sears AC powered jig saw and blades, Sears charger 4-2 amps, 6 volt, like new, also some cash for small bandsaw, no motor. State amount and condition of saw. Bulmer, 90 So. Main St., Rockland, Me.

WANTED — Manual and test charts for model 500B tube tester, manufactured by Precision Apparatus Co., about 15 years ago; 6 meter convertor for National NC300 receiver. Must be reasonable. Alan York, 35 Main St., East Hampton, N. Y.

TRADE OR SELL — Perfect boxed RCA and Raytheon tubes: 18—6-AK-5, 3—6J6. Want tube tester Eico, Superior, etc. I. W. Stubblebine, 140 South 4th St., Reading, Pa.

WANTED — Schematic or info for plug-in Tremolo or Vibrato unit for use with guitar amplifier. H. M. Picciani, 5942 Greenway Ave., Philadelphia 43, Pa.

SELL — Precision 912P tube tester, $45; Clough-Brengle 127 comb. scope and frequency modulator, $50; Hickok 640 or 770 scopes, $25. Want test equip. Paul Capito, 637 West 21st St., Erie, Pa.

FOR SALE — Small prop-pitch motor, selsyns, and transformer; Heathkit BE-4, $25 FOB. Want good TV rotator. Harold Denny, 10 Portersville Rd., Washington, Ind.

SELL — Winco dynamotor, con. duty, 6000 rpm, 28 v. input at 1.5 amps, 260 v. output at 70 mills, $4, or trade for 6 v. bell xfmr or RR-782 ballast tube. C. A. Ochs, PO 193, West Hyannisport, Mass.

SWAP — Following books for what have you? Relay Handbook NELA, Practical Electricity "Croft," Audel's Refrigeration and Air Conditioning Guide. Kauer Radio Service, 142 Mohr Ave., Buffalo 12, N. Y.

FOR SALE — Heathkit vibrator tester, $7; NRI radio manual No. 2, $7. Both like new. E. Spotter, 224-16 144th Avenue, Springfield Gardens 13, N. Y.

FOR SALE — Pickering arm $25; Pilot 3" TV $30; Meissner recorder, record player, PA and radio in portable case $35; power supply 1750 v. at 500 ma with UTC PA113 transformer on 10 x 17 x 3" chassis, $35. A. R. Dayes, 29 Charles St., Merrick, L. I., N. Y.

FOR SALE — All RCA: WV95A Master voltohmist with Hi Vo. probe, $69; WO55A 3" scope $75; WR67A radio gen., $44; WA54A audio gen., $44. All FOB. Frank Merrick, 195 Cedar Street, Hempstead, N. Y.

WANTED — Viking or Heathkit C/W transmitter or Hallicrafters S-94, S-95, S-38. Will trade for violin outfit. Ira Kraemer, 899 18th Ave., Newark 6, N. J.

WANTED — Sams Photofacts. Will pay top dollar. Need Nos. 252 up, and some earlier ones. Will send list on request. O. B. Hasson, 10441 Molette St., Bellflower, Calif.

WANTED — Overhead cutting lathe and cutting turntable with playback and recording amplifier. State cond., specifications and lowest price. Have for sale two model 1401 Concertone professional tape recorders and used Hi-Fi amplifiers. Widwest Recording Co., 1844 Spruce St., Quincy, Ill.

SELL OR TRADE — Unused FCC License Preparation course for 3rd, 2nd, and 1st class telephone license (RCA), 30 lessons, one year old, $35. Walter P. Ebner, 1813 So. Michigan Way, Denver 19, Colo.

WANTED — Heath AT-1, AC-1, QF-1, BE-4, VF-1, V-7A, SG-8, GD-1, CC-1, C-3, IT-1, auto radios, Vibroplex bugs, C-D Ant. rotators, CH. 36 UHF strips. What have you? Describe fully for cash offer. W. E. Buffington, 5208 Birkenhead Road, Jacksonville 10, Fla.

NEED — Radio test equipment, used radio and appliance repair books or courses. P. V. Radio, Armstrong, B. C.

FOR SALE — Simpson model 383 in-circuit capacitor leakage tester. Best cash offer over $50. Redd's Radio and TV Service, Box 12, Union Furnace, Ohio.

NEED — Hallicrafter CA2A low freq. receiver or other able to receive efficiently on loop. Need not have xmitting crystal. George D. Hoffeld, 38 First St., Troy, N. Y.

WANTED — Issue of Radio Electronics with 3 channel equalizer in same; also want 6' floor rack, VU meter, vertical head, 16" transcriptions. Harvey White, 1105 Waller Ave., Winnipeg 9, Canada.

FOR SALE — Two Blonder-Tongue MLA Masterline VHF broad band amplifiers, $48 each, and a Blonder-Tongue MMS mixer separator, $25. All in excellent condition. William R. Taylor, RD 2, Old Lyme, Conn.

TRADE — 8" Dunlap bench saw in good cond., for scope. Hillcrest TV Servicenter, RFD 2, East Chatham, N. Y.

FOR SALE — 80-10 500 w. xmitter, $400; 32V1, $330; SX-71 spkr, $170; HRO-50T spkr, coils, $270; HT-18, $35; Meissner EX, NBFM, $25; Telrex 3-el., 20 m., $50; TR4-B, indicator, $20. All instr. manuals, FOB. Paul Haczela, 310 Walnut Pl., Syracuse 10, N. Y.

WANTED — Radio Electronics course of 53 lessons by Supreme Publications. Wayne Sines, R. 1, Box 425, Oakland, Md.

FOR SALE — Three perfect RCA 826 tubes. Make offer. Steve Victor, 200 Park Blvd., Glen Ellyn, Ill.

FOR SALE — Factory rebuilt Leece-Neville alternator, 6 v., 90 amp, with new rectifier and regulator, in orig. cartons, $69. You pay shipping. C. N. Vallette, 1026 Claire Ave., Huntingdon Valley, Pa.

SELL OR TRADE — Heathkit TS-4 alignment generator and 0-6 scope, Hickok 135 VOM. Want AC instructograph, 150 to 174 mc FM receiver, Heathkit A-9 amplifier and DX-100 transmitter or what have you? Irby Kolb, 915 Greenwood St., Montgomery 7, Ala.

WANTED — Burned-out UTC transformer LS-3 size, for case replacement. H. A. Rollins, 355 Ashland Dr., San Antonio 9, Tex.

FOR SALE — Coin-oper. radios: "Tradios" 6-tube metal cabinets, $10 ea.; "McGuire" 6-tube wood cabinets, $8 ea. Both guaranteed. B. Taylor, 717 Currey Rd., Nashville, Tenn.

FOR SALE — Audel's Radioman's Electronics and TV guide $1.75, also RCA small 150B multimeter $6.95. Send money order, I pay postage. Ewell Churchill, Cord, Ark.

NEED POSITION — Radio and TV work. Graduate of NRI, have own equipment. Harry Carlile, 77 Washington, Seattle 4, Wash.

FOR SALE — DC-AC inverter ATR, 110 DC in, 110 AC out, 250 w. int., cont. 150. Model RSC. Charles W. Swanson, 40 Harding Rd., Norwood, Mass.

WANTED — Signal Corps TG-34-A keyer and tapes, for cash. Must be in good condition and reasonable. H. Butterworth, 2708 Gaither St. SE, Washington 21, D. C.

FOR SALE — BC-454 and BC-455 receivers complete less power pack, $5 each. A. C. Scofield, 119 So. 23rd St., LaCrosse, Wis.

POSITION WANTED — As Radio and TV serviceman — recent graduate of Industrial Training Institute of Chicago, Ill. Have done part-time radio and TV service work. Will furnish references. Henry E. Rust, 201 E. 7th St., Seymour, Ind.

FOR SALE — Rider Troubleshooting manuals Vol. 6-10, 12-14, exc. cond., $50 FOB or best offer. John Zach, 117 Hawthorne St., Manchester, Conn.

WANTED — Phono pickup from Presto 6K recorder, 1941 model. Will sell 1957 little used Wilcox-Gay tape recorder, dual speed dual speaker, $89.95. F. J. Rolando, Jr., Oglesby, Ill.

SELL OR TRADE — Geiger counter, S-38, Superior 770 tester, Regency TV booster, TV tube tester-rejuv. $25, relays, tubes, police AM rcvr $12, pair Jensen Hi-Fi concert speakers A-12, collector's items. Deuble, 3246 Baseline Rd., Grand Island, N. Y.

WANTED — Good ham rcvr and typewriter. Have Edison phonograph and cyl. records; 3AP1, 5BP1, 10BP4 crts.; dynamotor DY-34/ARR-15; model 806 GE TV; 2 old tube testers; 2 11 mm projectors. T. O. Miller, Box 411, Bucklin, Mo.

SWAP — RCA or Motorola automatic phono changer for cylinder head, for Evinrude Elto single cylinder outboard motor. Ed King, 129 East Marie St., Hicksville, N. Y.

FOR SALE — Power transformer, 1120 v. @ 500 ma CT; two 5 v. filament windings at 6 and 2 amps; two 6.3 v. at 3 and 0.3 amps, $5.75. S. S. Brody, 211-10 73rd Ave., Flushing 64, N. Y.

FOR SALE — Ge ST-5A marker generator with 1.5 mc and 4.5 mc crystals, and ST-4A sweep gen., with channel 2, 4, 5, 7, 9, 13 xtals; Hycon 622 color scope with probes. Sacrifice prices. Ross McCann, 940 College, Menlo Park, Calif.

FOR SALE — 2 meter Gonset Communicator 11 AC and 12 VDC, $170; Eico 425 5" scope, $15. G. Cherack, 104 Cedar Lane, Teaneck, N. J.

FOR SALE — Heath AT1, AC1; modulator plugs in, 3 xtals, key mike. AT1 modified for 40 w., now in use on 80 meters. Complete outfit, $40; extra mikes, $2.50 each. T. S. Grove, Box 50, Factoryville, Pa.

FOR SALE — Precise 630 RF-HF TV marker gen.; 907 deluxe VTVM; 300B scope and 2 probes; 111 GM and EM tube tester; Eico 360K TV; freq. sweep gen. and 5 mc crystal, all l. n. R. V. Delvick, 5013 Oaklyn Ave., Baltimore 6, Md.

WANTED — Dial and gear train for NC-100 receiver 1930 vintage roadster. Cash or trade surplus items. Hanna Service, 3023 Emmick, Toledo 6, Ohio.

FOR SALE — Holtzer-Cabot Inverter type MG149H. Input 28 v. DC, 44 a., output 26 v. AC 400 cy., 1 phase, 250VA, 100% PF, 115 v. AC, 400 cy., 1 phase, 500VA, 100% PF. $40 plus shipping costs. John W. Cale, Norwood, Mo.

FOR SALE — Transformers, cased, 117 v. tapped pri., sec. 2.5VCT 50A two ¾" ceramic standoffs, $10; sec. 2.5VCT 15A, pri. and sec. ceramic standoffs, $3.50 or 3 for $10. Want battery eliminator. J. M. Hirschinger, 417 Hampshire St., Quincy, Ill.

FOR SALE — National RDZ Navy receiver auto. tune, 10-channel, UHF, AM, battleship construction, 120 lbs., internally l. n., with spare part kits, $75 or make offer. York Marine Radio, Stonington, Conn.

WANTED — Schematic for RCA TT5 5" TV attachment. Paul Porcaro, 328 Central Ave., Brooklyn 21, N. Y.

FOR SALE — TS 323 U/R freq meter, 20-480 mcs, factory built regulated power supply, instr book, external battery cable mounted in sponge rubber lined carrying case. Cashier's check $250 FOB. Duncan Caldwell, 169 S. Shepherd St., Sonora, Calif.

FOR SALE — 2-meter mobile rig, Sonar MB-26 trans., SR-9 rcvr, excellent for fixed or mobile; ARC-5, 40 meters CW, 75 w. with power supply, regulated. Want low power 10-meter mobile rig. Peter Donohue, 16 E. Lincoln Ave., Cranford, N. J.

FOR SALE — Precision: ES500 scope, with matching probes, l. n., $75; 10-12 tube tester portable case, $50; 864 VOM 9" meter, $25; Approved A460 field strength meter in shockproof case, $35. Precision Service Co., 937 Center St., Brockton 58, Mass.

WANTED — Calibration chart, realignment procedure and instructions for model A-460 field strength meter or present address of Approved Electronic Instru. Corp. Russell F. White, 117 N. Partin Dr., Niceville, Fla.

WANTED — Information and/or schematic of push-button PB-200 multimeter. Who was manufacturer? Melvin J. Brooks, Jr., 2912-C Liberty Pkwy, Baltimore 22, Md.

WANTED — Good communication rcvr, Telrad T18 standard, printing press, for cash or Delta 11" wood lathe and accessories, also tubes, resistors, small parts, magazines. Stamp brings list. M. Marshall, 455 Washington Avenue, Dumont, N. J.

FOR SALE — 5" DeVry scope $35; Heath VTVM V-7A $23, Heath RF generator $18; 58 RCA GE assorted radio tubes and parts valued at $90, only $65. Write for details. W. R. Seng, 118 Ardmore Dr., Oxford, Ohio.

SELL OR SWAP — Surplus parts from BC375. 7166 kc. novice xtal. in Ft-43; portable low volt circuit tester (battery, generator, regulator); 1938 books: Terman's Fundamentals of Radio, The Radio Manual by Sterling. Need telescopic antennas 10-12 ft. long. H. Francis Berkshire, Lanark, Ill.

FOR SALE — Complete mobile station: Sonar 8-tube receiver with power pack, Carter genemotor 600 VDC at 250 mil., transmitter pi output with modulator 50 w., 80 mtr loading coil and antenna, $65 FOB or trade. M. E. West, Rt. 2, Lenoir, N. C.

FOR SALE — Wilcox KW buffer-pi network final, meters in metal cabinet, less tubes, $70 FOB. H. D. Beebe, Missouri Valley, Iowa.

TRADE — Regency TR-1 transistor radio, l. n., red case, new battery, used only as demonstrator, for communications receiver or Bogen BB-1 booster. D. L. Turner, 2019 Sherman St., Anderson, Ind.

FOR SALE — 1st and 2nd IF coils 456 kc, will fit most any set, one matched pair 95c prepaid. Paramount Radio and TV Co., Box 793, Largo, Fla.

WANTED — Manual on Navy RAL7 radio receiver CRV46156. Prefer to purchase or will borrow. O. H. Sandman, 1404 No. Glendale St., Peoria 3, Ill.

WANTED — Superior powerstats, type 10, 1.25A; cash or trade. R. Rogers, 28 Bellamy St., Boston 35, Mass.

WANTED — Bantal tubes, Hytron types: 113, 115, 125, any condition; also 1927 Allied Radio catalog urgently needed. Will pay cash. W. L. Beatty, Sr., 1819 Gummer Ave., Dayton 3, Ohio.

SELL OR TRADE — Tube tester; Speco sig. tracer; RCA Jr. voltohmyst; VTVM; '49 Buick car radio; Sonomatic console radio; 17" TV sets. Can use good scope. Harold Wurm, 1015 W. Grant St., Appleton, Wis.

FOR SALE — Garrard: RC80M automatic record changer on base, 3 plug-in pickup heads, stylus pressure gauge; 2 GE variable reluctance cartridges (1 mil diamond, 3 mil sapphire) 45 rpm spindle. Best offer. John Krofta, 420 West Van Beck Ave., Milwaukee 19, Wis.

SELL OR TRADE — Magazines: Radio and TV News Jan. 1949 to Dec. 1956; Service May 1951 to July 1955; Capacitors May 1949 to Dec. 1956. Jack M. Rever, 3022 Iona Terr., Baltimore 14, Md.

FOR SALE — Riders manuals 11-14; Sams 1 and 2. All with indexes in excellent condition, $7 each. You pay transportation. T. B. Winstead, Elm City, N. C.

FOR SALE — Heath TV alignment gen., TS-3, $32.50; meter from Hickok 209A, perf., $18; Coast Guard comm. rcvr, 200 kc to 19 meg, $30; Webcor 121 3-speed changer in carrying case, $20; Heath SG-8 RF sig. gen., hardly used, $18. N. Kulke, 19620 Pasnow Ave., Euclid 19, Ohio.

FOR SALE — LM freq. meter, orig. calibration book, A-1 operating condition, home-brew regulated power supply, orig. not available. Best offer. Power supply optional $5. James Baker, 1531 So. 13th St., Harrisburg, Pa.

WANTED — A 6' 19" floor rack; vertical head with or without arm; good RCA 630 TV; VU meters. Have for sale TW2000 S20R Hallicrafter. Harvey White, 1105 Waller Ave., Winnipeg, Canada.

SELL OR TRADE — Two Spark xmtrs antique condensers, rcvrs freq standard 1000-100-10 kc xtal, RCA police AM xmtrs. Need BC-221 or good 2 and 6 meter equip., Viking VFO. William E. Barrett, 2828 So. Ninth, Sheboygan, Wis.

FOR SALE — Factory wired Johnson Viking Ranger, perf. operating cond., reasonable 1st offer above $180. George Wilner, 1248 White Plains Rd., Bronx 72, N. Y.

SELL OR TRADE — Heath scope, VTVM, capacitor checker, RF signal generator, all probes; 5' stack TV diagrams, service info; misc. books. Best offer over $100 or trade for good 35 mm enlarger, photolab equipment. J. C. Kloppin, 6 St. Francis St., Mobile, Ala.

TRADE — RCA WO88A scope with diode probe, current price $179.50. Need BC-221 or equivalent with cal. book. F. A. Nichols, 720 East Eldorado St., Appleton, Wis.

WANTED — Blank calibration book for LM or BC-221 freq. meter. C. W. King, R. 1, Box 98-H, Sandston, Va.

FOR SALE — Like new B-T booster HA-2-M, $10, excellent condition. Droesch Radio-TV Service, Box 147, Burkettsville, Ohio.

FOR SALE — Kay Maga-Sweep generator, $200; GE YRS-1 SSB adapter for any 455 kc IF receiver, $60 or will consider trading rec. for mobile transmitter. E. J. Theroux, 65 Cedar Dr., Farmingdale, L. I., N. Y.

WANTED — Hickok 600-A tube tester, advise price and condition. Varner's TV-Radio Service, 19 Greenbrier Rd., Portsmouth, Va.

SWAP — Dynamotors: 28v-250v, .06A.; 13v-360v, .135A.; 27v-400 or 750v, .750A.; two Motor-Generators 24-28vDC to 115v AC, 7A. Need Graphic Arts machinery or what have you? Frank Yasi, 99 Purdon Ave., Lynn, Mass.

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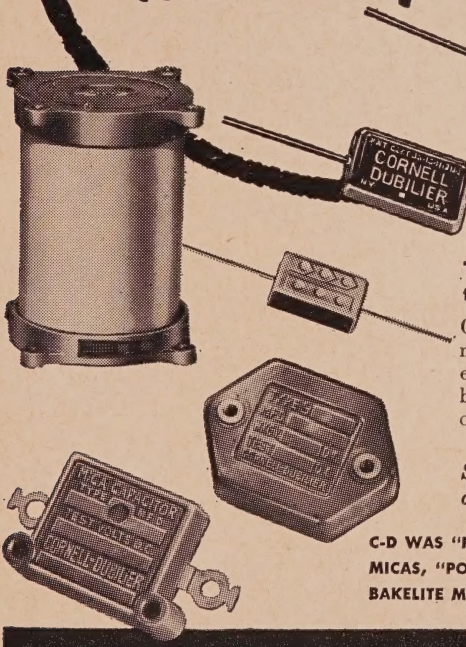

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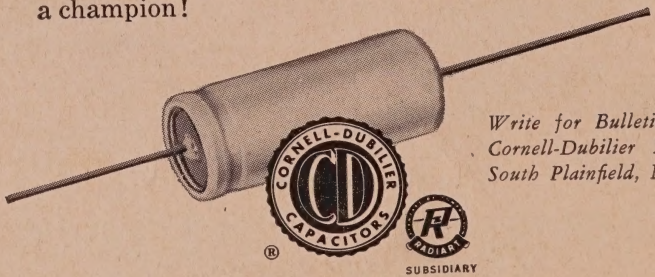

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